Determination of Age Structure and Cohort Reconstruction of Central Valley Chinook Salmon Populations

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Public Comments

No public comments were received for this proposal.

Initial Selection Panel Review

Proposal Title

#0230: Determination of Age Structure and Cohort Reconstruction of Central Valley Chinook Salmon Populations

Funding:

Do not fund

Initial Selection Panel (Primary) Review

Topic Areas

- Life Cycle Models And Population Biology Of Key Species
- Assessment And Monitoring
- Salmonid−related Projects

Please describe the relevance and strategic importance of this proposal in the context of this PSP. How does the proposal address the topic areas identified above? What are the broader CALFED Goals this proposal may meet that are not accounted for in these specific topic areas?

On−topic and of strategic importance to water storage and transfer actions. Provides basis for fuller investigation of how ecosystem conditions and water management strategies influence Chinook populations. Should help over time in more precise monitoring of sucess of management and restoration actions. Reviewers had questions about predictive ability, and I must defer to secondary reviewers and others to help evaluate the scientific merit of this proposal in comparison to other possible candidates. This work would seem to have great value, even if some driving forces in the life cycle are not fully covered in this particular study. Not clear from my review if shortcomings would simply bound the results, or possibly vitiate them (Seek guidance from others on the panel in this regard).

The budgets of proposals submitted in response to this PSP are larger, on average, than those submitted to CALFED in previous years. The Science Program is committed to getting as much science per dollar as is reasonably possible. With this commitment in mind, can the proposed budget be streamlined? If so, please recommend and clearly justify a new budget total in the space provided.

Reviewers had no direct suggestions, and I do not have the expertise to tweak the budget. Others on the panel may have suggestions.

Evaluation Summary And Rating.

Provide a brief explanation of your summary rating and any additional comments you feel are pertinent.

Selection Panel (Discussion) Review

fund this amount: $**0**
note:
do not fund

The Panel felt that this proposal would provide key information that has long been needed. Some of this work has been conducted in the past, but never at a spatial extent or intensity necessary to derive the information that this project will likely produce. This information will provide a valuable benchmark against which to measure the success of restoration efforts targeted towards salmonids. These data are collected in other ecosystems and the Panel felt that it was essential that they be collected in this watershed. Indeed, the Panel felt strongly that salmonid management in the system was dependent on the availability of this kind of information.

Although this panel felt that this project was very important, it was also unanimous in its opinion that funding the project from this proposal solicitation was inappropriate as it is essentially a baseline–monitoring project. The panel believed this project should be funded by CALFED's Ecosystem Restoration Program. If ERP chooses to fund this project, that program should consider requiring project modifications

identified by earlier technical and Technical Panel reviews. In addition, the budget could be reduced by eliminating some of the field supplies and by requiring collaboration with other ongoing monitoring programs.

Panel Ranking: Do not Fund

Technical Synthesis Panel Review

Proposal Title

#0230: Determination of Age Structure and Cohort Reconstruction of Central Valley Chinook Salmon Populations

Final Panel Rating
above average

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

Investigators from CA DFG and FSMFC propose an extensive demographic study of Chinook salmon across 14 stocks in Central Valley rivers. Large samples of scales will be collected across stocks and hatchery and wild groups to permit run sizes to be accurately matched to stock−specific harvests and hatchery releases. That current management of Chinook salmon depends only upon metrics from two stocks (escapement) and assumed age structure is problematic for a species with complex age structure, overlapping generations, and demographic attributes, which are likely to vary across many strains occurring in the Central Valley. In this demographic study, PI s will calculate a cohort replacement rate (CRR) based upon estimates of juvenile abundance, ocean and river harvests, straying rates, and year−class assignment of spawners. In that only the last element of the CRR is directly addressed by this study, many assumptions are needed still in its derivation. Correct assignment of year−class will also improve estimates of hatchery contribution rates. 550 scale samples will be taken from 14 salmon runs, and ageing and analyses will be aided by SOP s developed from a previous study undertaken by the PI s in the Klamath River. From milestone table, samples will apparently be drawn in each year of the study, although this is not specified in the body of

the proposal. Year−class assignment will be critical in predicting run sizes and CRR s based upon the proposed "Klamath Ocean Harvest Model."

Additional Comments:

There is strong reason to support the more intensive and consistently performed demographic study proposed here. Feasibility, monitoring, data products and capabilities (evidence seen in data products from Klamath River demographic study) are strong elements of the study. Goals are quite practical and approach seemed mechanical, without due consideration of underlying models, assumptions, error and statistical approaches. Cohort Replacement Rate should have been more specifically defined for the external reviewers. I think a better conceptual and quantitative description of this metric was warranted. In that it is a rate, there seems implied a denominator – is this based upon smolt numbers for each run? Assumptions related to estimating how runs are intercepted in ocean harvests by CWT returns deserved additional explanation and justification. There was some indication that the project was aimed more toward improving monitoring rather than testing scientific hypotheses. I would have liked to have seen more explication on sample size justifications and the Klamath Ocean Harvest Model. The absence of these elements and lack of strong population dynamics/statistics background by PI s could cause problems in most efficiently using resources to obtain data products and analyzing data to best advantage. Still, both PI s have strong background in coordinating survey and ageing studies. Both reviewers recognized that lack of rigorous age structure data collection of Central Valley Chinook salmon represents a substantial gap in programs of salmon restoration. The extensive look across geographic areas and stocks was seen as a strong element. Feasibility and quality of demographic studies was emphasized based upon previous experience of PI s in Klamath River. The Technical Panel Secondary Reviewer noted that if CRR is more expensive or difficult to estimate, then testing this against escapement and other indices is crucial. The proposal could be improved if CRR was compared to other population indices such as escapement. Still, reviewers felt

that the raw data products alone will be quite valuable. The project was conceived as somewhat routine, albeit necessary, without formal hypothesis development, tests of assumptions and alternative demographic models, and estimates of error. It was unclear if substantive peer−review publications would result from the proposed study. One reviewer noted the budget contained excessive labor costs; the other thought costs were reasonable.

Investigators from CA DFG and FSMFC propose an extensive demographic study of Chinook salmon across 14 stocks in Central Valley rivers. Large samples of scales will be collected across stocks and hatchery and wild groups to permit run sizes to be accurately matched to stock−specific harvests and hatchery releases. That current management of Chinook salmon depends only upon metrics from two stocks (escapement) and assumed age structure is problematic for a species with complex age structure, overlapping generations, and demographic attributes, which are likely to vary across many strains occurring in the Central Valley. In this demographic study, PI s will calculate a cohort replacement rate (CRR) based upon estimates of juvenile abundance, ocean and river harvests, straying rates, and year−class assignment of spawners. In that only the last element of the CRR is directly addressed by this study, many assumptions are needed still in its derivation. Correct assignment of year−class will also improve estimates of hatchery contribution rates. 550 scale samples will be taken from 14 salmon runs, and ageing and analyses will be aided by SOP s developed from a previous study undertaken by the PI s in the Klamath River. From milestone table, samples will apparently be drawn in each year of the study, although this is not specified in the body of the proposal. Year−class assignment will be critical in predicting run sizes and CRR s based upon the proposed "Klamath Ocean Harvest Model."

Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

Determination of age structure and cohort reconstruction of Central Valley Chinook salmon populations Both the primary and the secondary reviewers rated this proposal as above average. The panel found the proposal would provide valuable information on the age structure of Chinook salmon. Use of demonstrated techniques was recognized as a strong component of the proposal but there was no discussion in the proposal on inherent uncertainties that could occur in application of the techniques to a new system. One concern is the assumption that this approach would be as straight−forward as indicated in the proposal. Ocean mortality is unknown, but is a significant contributer to the key product of the proposal −− cohort replacement rate. Any variance in that parameter could cause a large bias in the results. The proposal is mostly monitoring for management, and is not likely to contribute much new scientific knowledge. No peer reviewed publications are expected, which is a significant weakness of the proposal.

Final Ranking: Above Average

Technical Review #1

proposal title: Determination of Age Structure and Cohort Reconstruction of Central Valley Chinook Salmon Populations

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**For CALFED projects that aim to restore Central Valley Chinook salmon, adult escapement is presently the data used to monitor their effectiveness; the authors assert that cohort replacement rate (CRR) is considered to give a more accurate picture of population trends and is therefore a more useful measure of success. CRR requires information on the age structure of each run, information that they propose to obtain via scale and ageing analysis. One of the major goals of the CALFED science program is to provide evaluation of existing monitoring efforts and 'strategic design of monitoring to fill gaps in performance assessment information,' including long-term performance assessments. The authors propose to provide information relevant to and consistent with these CALFED goals.** **The goals and objectives of this proposal are clearly stated and internally consistent; however, the authors propose few hypotheses as they are focused on obtaining data important for monitoring purposes and for input into existing fisheries model, rather than testing a particular approach or framework used for monitoring and fisheries modeling.**
Rating	**very good**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**Is the study justified relative to existing knowledge?** **Yes – they address a clear knowledge gap concerning Central Valley Chinook salmon.** **Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work?** **Yes. Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?** **the CRR method and fisheries models they intend to use have been implemented elsewhere in the Klamath River basin; this provides a practical basis for the work on Central Valley Chinook salmon. The Klamath River example serves as a pilot and demonstration project for this proposal; therefore, if it is funded, full−scale implementation appears justified.**
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**Is the approach well designed and appropriate for meeting the objectives of the project?** **Their methods and validation of ageing are rigorous,**

	but they do not outline the assumptions of the CRR analysis. Although they state that this analysis will allow estimation of ocean fishery impacts via ocean contact rates and forecasts of hatchery and natural spawners, they do not state the reliability or potential error behind these estimates and forecasts and the nature of the errors. **Is the approach feasible?** **Yes** **Are results likely to add to the base of knowledge?** **Yes. Beyond the modeling methodologies are proposed by the authors, the raw data on age structure of the populations can be used for a variety of purposes and should prove and invaluable long−term data set as CALFED restoration projects continue.** **Is the project likely to generate novel information, methodology, or approaches?** **The project will generate novel information, but no new methodologies or approaches.** **Will the information ultimately be useful to decision makers?** **Absolutely. Because CALFED salmonid restoration efforts involve improving freshwater rearing habitats, it is essential to do an age−structured analysis to really evaluate their success. The authors clearly prioritize coordination and data−sharing, and their information could be used for a variety of purposes to further CALFED restoration efforts.**
Rating	**very good**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**Is the approach fully documented and technically feasible?** **Yes. Because their methodologies have been implemented successfully in the Klamath, the approach has been fully document and has been feasible in that setting.** **What is the likelihood of success?** **Very good, as long as returns are sufficient to collect enough of a sample size, a circumstance that the authors of the proposal have little control over.** **Is the scale of the project consistent with the objectives and within the grasp of authors?** **Yes.**
Rating	**excellent**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)?** **Not applicable, because the project is intended to supplement and inform monitoring programs already in place.** **Are there plans to interpret monitoring data or otherwise develop information?**

	The more detailed data generated by this project can be used for a variety of purposes, including cohort reconstruction, estimation of size of each brood year's ocean abundance by month, and differentiation between hatchery and natural populations. With these data, they can analyze the effects of water management and ecosystem restoration actions on cohort size and cohort replacement rates.
Rating	**excellent**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**Are products of value likely from the project?** **Yes** **Are contributions to larger data management systems relevant and considered?** **Yes, they plan to coordinate their database with multiple agencies through the Interagency Ecological Program and the CVPIA Comprehensive Assessment Monitoring Program database. Coordination and dissemination of the data and model results is clearly a priority of this proposal.** **Are interpretive (or interpretable) outcomes likely from the project?** **Yes.**
Rating	**excellent**

Additional Comments

Comments

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	**What is the track record of authors in terms of past performance?** **The authors have extensive experience with the type of work entailed in this proposal. They do not have a lengthy publication record and are unlikely to rigorously and scientifically critique their methodologies, but their background in fisheries management, their familiarity with the methods and modeling used for this type of analysis is a clear indication that the authors are capable of executing this project and seeing it through. Their proposed data collection is rigorous and careful and shows clear experience with the kind of errors inherent in age determination with scales.** **Is the project team qualified to efficiently and effectively implement the proposed project?** **One of the authors of the proposal was the co-author of the Klamath Ocean Harvest Model, and is therefore quite qualified. The other author is familiar with coordination and data management and collection and is clearly a valuable asset to the proposed project.** **Do they have available the infrastructure and other aspects of support necessary to accomplish the project?** **Yes, they have the facilities to accomplish the project.**

Rating	**excellent**

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**The cost of this project is very high, mainly because of labor coasts. In particular, the hourly wage for technicians is quite high and is extended over three years (see Task 2, Scale analysis: Labor), which dramatically increases the budget request. This project involves many hours of scale analysis and field work. My 'sticker shock' at that cost may be due to my lack of experience supervising this kind of long-term data-intensive project. The authors have this experience, therefore, this cost may be justified. Otherwise, the budget appears reasonable.**
Rating	**very good**

Overall

Provide a brief explanation of your summary rating.

Comments	**This proposal identifies a gap in current knowledge that prevents a comprehensive assessment of population trends of Central Valley Chinook Salmon populations and their response to CALFED restoration activities. The proposed goals fall under the following 'general topic' of interest for the CALFED Science program (stated in the PSP): "Performance assessment to improve tools and implications of future changes." The goal of this proposal is to provide the data to replace a current 'measure of success' for CALFED ecosystem restoration programs with a more refined, detailed measure.** **The products from this project will be very useful. My only critique is that the authors do not outline**

	important assumptions of the models they propose to use, the potential for bias, or plans to test if bias is an issues. The authors are not planning on developing novel models or approaches; they also do not plan to test or compare the effectiveness of existing fisheries models with this data set. Instead, they are using already developed approaches and assume that they produce valid, unbiased results. **Regardless of the models used, the age−structure data generated by this proposal will be high quality – the methods the authors propose are rigorous and consider the usual errors and bias associated with ageing data. The results will be a useful addition to and refinement of the Chinook salmon monitoring program. I was impressed with the author's emphasis on data sharing and agency coordination and cooperation, essential for the success of this type of project.**
Rating	**excellent**

Technical Review #2

proposal title: Determination of Age Structure and Cohort Reconstruction of Central Valley Chinook Salmon Populations

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**The three objectives are clearly stated and clearly related to the goals. The hypotheses are straightforward. According to the authors the 'idea' has been established by groups of scientists and managers and will be an important contribution to salmon management in the Central Valley.**
Rating	**excellent**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**The study is well founded in exisiting knowledge and seeks to apply established methods to a new geographical area and fish stock(s) that would benefite from from more extensive sampling (scale analysis) and subsequent modelling. The conceptual model is well laid out particualry in light of an existing program that seeks the same information in another area. Full scale implementation is justified given the apparent success in another basin.**
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The approach is well designed and the approach feasible. No new ground is being broken here, just the necessary expansion of existing protocols and programs. Novel information will not necessarily be generated but important information for managers/decision makers will be generated**
Rating	**excellent**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**Given the experience of the investigators and the similarity to a like effort the likelihood of success is high.**
Rating	**excellent**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**Plans are in place to develop and interpret the data. However, I could not find much about evaluating the model predictions. It is clear that the data are useful in estimating cohort sizes, for recommending harvest quotas, and for measuring recovery of salmon relative to established goals. The proposal could be improved by a clear statement of how**

	predictions are checked, how differences are resolved, and how the model can be calibrated based on the findings.
Rating	**good**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**The products are part of a larger effort to manage salmon and the data will be used in existing data management systems. Interpretive outcomes are the main product of this project.**
Rating	**excellent**

Additional Comments

Comments	**Given the importance of the problem and the recommendations of scientists/managers working in the area, the proposed data gathering and modelling should have been underway already**

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	**The authors are well qualified managers for this kind of project and have adeqaute infrastructure. The success will be determined to a large extent by hiring the right biologist to perform and oversee the field work and data aquisition.**
Rating	**excellent**

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**The budget appears reasonable. Although not required, there is considerable in-kind offered by the two agencies.**
Rating	**excellent**

Overall

Provide a brief explanation of your summary rating.

Comments	**This proposal addresses a straightforward problem in data aquisition identified by scientists and managers as important to improving management of salmon in the Central Valley. The project will provide the data and put it into existing cohort models. The results will be useful in judging whether salmon populations are meeting rebuilding goals while allowing traditional harvest to continue.**
Rating	**excellent**